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#31

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: J. Bednorz et al.

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Group Art Unit: ~~1105~~ / 751 /

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Examiner: M. Kopec

For: NEW SUPERCONDUCTIVE COMPOUNDS HAVING HIGH TRANSITION TEMPERATURE, AND METHODS FOR THEIR USE AND PREPARATION

The Commissioner of Patents and Trademarks
Washington, D.C. 20231

AFFIDAVIT UNDER 37 CFR 1.132

Sir:

I, Thomas M. Shaw, being duly sworn, do hereby depose and state:

I received a B.S. degree in Metallurgy from the University of LIverpool, Liverpool, England and a M.S. and PhD. degree in Materials Science (1981) from the University of California, Berkeley.

I have worked as a postdoctoral researcher in the Material Science Department of Cornell University from 1981-1982. I worked at Rockwell International Science Center in Thousand Oaks, California from 1982-1984 as a ceramic scientist. I have worked as a research staff member in Ceramics Science at the Thomas J. Watson Research

Center of the International Business Machines Corporation in Yorktown Heights, N.Y. from 1984 to the present.

I have worked in the fabrication of and characterization of ceramic materials of various types, including superconductors and related materials from 1984 to the present.

Attached is a resume of my publications. I have reviewed the above-identified patent application and acknowledge that it represents the work of Bednorz and Mueller, which is generally recognized as the first discovery of superconductivity above 26°K and that subsequent developments in this field have been based on this work.

That all the high temperature superconductors which have been developed based on the work of Bednorz and Mueller behave in a similar manner, conduct current in a similar manner and have similar magnetic properties.

That once a person of skill in the art knows of a specific transition metal oxide composition which is superconducting above 26°K, such a person of skill in the art, using the techniques described in the above-identified patent application, which includes all known principles of ceramic fabrication known at the time the application was filed, can make the transition metal oxide compositions encompassed by the claims in the above-identified application, without undue experimentation or without requiring ingenuity beyond that expected of a person of skill in the art. This is why the

work of Bednorz and Mueller was reproduced so quickly after their discovery and why so much additional work was done in this field within a short period of their discovery.

The general principles of ceramic science referred to by Bednorz and Mueller in their patent application can be found in many books and articles published before their discovery. An exemplary list of books describing the general principles of ceramic fabrication are:

1) Introduction to Ceramics, Kingery et al., Second Edition, John Wiley & Sons, 1976, in particular pages 5-20, 269-319, 381-447 and 448-513, a copy of which is attached herewith.

2) Polar Dielectrics and Their Applications, Burfoot et al., University of California Press, 1979, in particular pages 13-33, a copy of which is attached herewith.

3) Ceramic Processing Before Firing, Onoda et al., John Wiley & Sons, 1978, the entire book, a copy of which is attached herewith.

4) Structure, Properties and Preparation of Perovskite-Type Compounds, F.S. Glasso, Pergamon Press, 1969, in particular pages 159-181, a copy of which is attached herewith.

An exemplary list of articles applying their general principles of ceramic fabrication to the types of materials described in applicants' specification are (these references are cited on applicant's 1449 form submitted August 5, 1987 and in PTO Form 892 in Paper # 20, Examiner's action dated August 8, 1990):

1) Oxygen Defect K_2NiF_4 - Type Oxides: The Compounds $La_{2-x}\ Sr_xCuO_{4-x/2+\delta}$, Nguyen et al., Journal of Solid State Chemistry 39, 120-127 (1981).

2) The Oxygen Defect Perovskite $BaLa_4\ Cu_5$-$0_{13.4}$, A Metallic Conductor , C. Michel et al., Mat. Res. Bull., Vol. 20, pp. 667-671, 1985.

3) Oxygen intercalation in mixed valence copper oxides related to the perovskite, C. Michel et al., Revue de Chemie minerale, p. 407, 1984.

4) Thermal Behaviour of Compositions in the Systems x $BaTiO_3$ + (1-x) $Ba(Ln_{0.5} B_{0.5}) O_3$, V.S. Chincholkar et al. Therm. Anal. 6th, Vol. 2., p. 251-6, 1980.

By: Thomas M. Shaw
Thomas M. Shaw

Sworn to before me this 14th day of December, 1998.

Sandra M. Emma
Notary Public

SANDRA M. EMMA
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Commission Expires July 5, 2002

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1. D.R.Clarke and T.M.Shaw, D.P.Thompson, "Direct Observation of the Polytype Periodicities in the Be-Si-O-N System.", J. Mat. Sci. 13 pages 217-219 (1978)

2. T.M. Shaw, "Transmission Electron Microscopy Analysis of Complex Nitrogen Ceramics", Proceedings of the 9th International Congress on Electron Microscopy, Toronto. Ed J.M. Sturgess (Microscopical Society of Canada, 1978). Vol. 1 Page 258.

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8. T.M. Shaw and G. Thomas,"An Electron Microscopy Study of Crystallography and Phase relationships in the Be-Si-N system", J. Solid State Chem. 33, pages 63-82 (1980).

9. T.M. Shaw and G. Thomas "The crystallization Behavior of a Mg- Si-O-N Glass " in Progress in Nitrogen ceramics, Proceedings of the NATO Advanced Study Institute, Ed F.L.Riley, Martinius Nijhoff (1983).

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11. P.E.D. Morgan and T.M. Shaw, "Magnetoplumbite Related Barium Aluminates", Mat. Res Bull. 18, pages 539-542 (1983).

12. P.E.D.Morgan, T.M.Shaw and E.A.Pugar "Ceramics For High Waste Loaded Commercial Radwaste disposal"In Advances in Ceramics, Vol 8, Nuclear Waste Management. Ed G.G.Wicks and W.A.Ross. Published Amer. Ceram. Soc. 1984.

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17. T.M.Shaw "Liquid Phase Redistribution During Liquid Phase Sintering" J. Amer. Ceram. Soc. Vol.69 P.88 (1986)

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